Hanna Furnace Subparcel 3
Union Ship Canal Public Open Space

ERIE, NEW YORK

Final Engineering Report

NYSDEC Site Number: B00164

Prepared for:

Buffalo Urban Development Corp.

275 Oak Street, Suite 150 Buffalo, New York 14203

Prepared by:

Arcadis

50 Fountain Plaza, Suite 600

Buffalo, New York 14202

(716) 667-0900

JUNE 2022

CERTIFICATIONS

I, Michael Higgins, am currently a registered professional engineer licensed by the State of New York, and I certify that the Remedial Design (RD) was implemented and that construction activities were completed in substantial conformance with the Department-approved RD.

I certify that the data submitted to the Department with this Final Engineering Report demonstrates that the remediation requirements set forth in the RD and in applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in the remedy.

I certify that use restrictions, Institutional Controls, and Engineering Controls, are contained in an environmental easement created and recorded pursuant ECL 71-3605 and that affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

I certify that a Site Management Plan has been submitted for the continual and proper maintenance and monitoring of Engineering Controls employed at the Site and that such plan has been approved by Department.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Michael Higgins, of Arcadis, am certifying as Owner's Designated Site Representative for the Site.

MICHAEL HIGGINS — NYS Professional Engineer # 089643

04/18/2022 — Date

Michael Higgins — Signature

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LIST OF ACRONYMS

Acronym	Definition
BUD	Beneficial Use Determination
CAMP	Community Air Monitoring Plan
EE	Environmental Easement
EC/IC	Engineering Control/Institutional Control
FER	Final Engineering Report
HASP	Health and Safety Plan
NYSDEC	New York State Department of Environmental Conservation
PCB	Polychlorinated biphenyl
PRR	Periodic Review Report
RD	Remedial Design
ROD	Record of Decision
SAC	State Assistance Contract
SCO	Soil Cleanup Objective
S/FMP	Soil/Fill Management Plan
SMP	Site Management Plan
SSAL	Site-Specific Action Level
SWPPP	Storm-Water Pollution Prevention Plan
$\mu g/m^3$	micrograms per cubic meter
USACE	United States Army Corps of Engineers
VOC	Volatile Organic Compound
SVOC	Semi-volatile Organic Compound

FINAL ENGINEERING REPORT

1.0 BACKGROUND AND SITE DESCRIPTION

The City of Buffalo and County of Erie entered into a State Assistance Contract (SAC), with the New York State Department of Environmental Conservation (NYSDEC) in February 2005, to remediate a 22-acre property (Site) and the approximately 8-acre eastern end of the Union Ship Canal that is surrounded by the 22-acre Site, located in Buffalo, Erie county, New York. The Site property was remediated to commercial use, and will be used as a passive, green space, park, and central feature of the Buffalo Lakeside Commerce Park. The canal sediments were covered with clean stone and an underwater berm was constructed to support sections of the canal wall.

The Site is located in the County of Erie, New York and is identified as Block 1 and Lots 4.1 and 5.1 on the Buffalo Tax Map #132.19. The Site is situated on an approximately 22-acre area bounded by BLCP Parcel 4 to the north, BLCP Parcel 2 to the south, Ship Canal Parkway to the east, and Fuhrman Blvd. to the west (see Figure 1). A two-part project Site plan is provided on Figures 2A and 2B. The boundaries of the Site are fully described in Appendix A: SAC with Metes and Bounds.

2.0 SUMMARY OF SITE REMEDY

2.1 REMEDIAL ACTION OBJECTIVES

Based on the results of the Site Investigation, performed by URS in 2001, the following Remedial Action Objectives were identified for this Site.

2.1.1 Soil RAOs

The RAO for Public Health Protection is the prevention of ingestion/direct contact with contaminated soil/fill.

2.1.2 Sediment RAOs

The RAO for Public Health Protection Prevent direct contact with contaminated sediments RAOs for Environmental Protection Prevent impacts to biota due to ingestion/direct contact with contaminated sediments that could cause toxicity or bioaccumulation through the marine or aquatic food chain.

2.2 DESCRIPTION OF SELECTED REMEDY

The Site was remediated in accordance with the remedy selected by the NYSDEC in the Record of Decision (ROD) dated February 2005.

The factors considered during the selection of the remedy are those listed in 6NYCRR 375-1.8. The following are the components of the selected remedy:

1. Removal of surface debris and large debris from within the canal (e.g. submerged cars).

2. Establishment of Site grade to required elevations for redevelopment. Placement of a demarcation layer on final subgrade.

3. Excavation and off-Site disposal of soil/fill exceeding Site-Specific Action Levels (SSALs) adopted from the Parcel 1/Parcel 2 Remedial Action Work Plan at the direction of the NYSDEC project manager.

4. Construction and maintenance of a soil cover system consisting of a minimum of 2-feet of clean soil to prevent human exposure to remaining contaminated soil/fill at the Site.

5. Construction of an underwater sand stabilization berm along the eastern end of the north canal wall, placement of a 1-foot clean sediment cover over the entire eastern half (~1900 feet) of the Union Ship Canal, and construction of shallow water fish habitat.

6. Execution and recording of an Environmental Easement (EE) to restrict land use, groundwater use, and prevent future exposure to any contamination remaining at the Site.

7. Development and implementation of a Site Management Plan (SMP) for long term management of remaining contamination as required by the EE, which includes plans for: (1) Soil/Fill Management (S/FMP) (2) Engineering and Institutional Controls (EC/ICs) and (3) Inspection, Certification, and Reporting via a Periodic Review Report (PRR).

At the time that the ROD was issued, the 6 NYCRR Part 375 regulations did not distinguish between active and passive recreational Site uses. Regulations now allow that 12 inches of clean soil cover is protective for passive recreational sites.

The Site was designed and built as a public park, with paved and gravel walkways, paved parking lots and landscaped areas. The park does not include athletic fields or playgrounds (i.e., areas that would be considered suitable for active recreation). Therefore, the reasonably anticipated use of the Site would not likely result in heavy foot traffic over the soil cover.

Given the passive recreational use of the site, the remedy outlined above was modified to a soil cover system consisting of a 1-foot minimum thickness to prevent human exposure to remaining contaminated soil/fill at the Site. An “Explanation of Significant Difference” (February 2017) prepared by the NYSDEC can be found in Appendix L, which further explains this modification.

3.0 INTERIM REMEDIAL MEASURES, OPERABLE UNITS AND REMEDIAL CONTRACTS

The remedy for this Site was performed as a single project, and no interim remedial measures, operable units or separate construction contracts were performed.

4.0 DESCRIPTION OF REMEDIAL ACTIONS PERFORMED

Remedial activities completed at the Site were conducted in accordance with the NYSDEC-approved RD for the Union Ship Canal – Public Open Space Parcel 3 Development Site (August 2009).

4.1 GOVERNING DOCUMENTS

4.1.1 Site Specific Health & Safety Plan (HASP)

Remedial work performed under this Remedial Action was in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal Occupational Safety and Health Administration.

The HASP was complied with for remedial and invasive work performed at the Site.

4.1.2 S/FMP

A Site-Specific S/FMP was prepared by Malcolm Pirnie, Inc. in June 2009. The S/FMP provided soil handling, sampling, and analytical procedures that were followed during Site remediation and redevelopment. Man O' Trees, Inc's (Contractor) environmental health and safety subcontractor followed provisions of the S/FMP to characterize excavated soil/fill and imported soil.

Part of the S/FMP was a Beneficial Use Determination (BUD) amendment letter (BUD# 660-9-15) for the reuse of water treatment plant residuals as an amendment to clean soil for use in the 1-foot Site cover. The BUD amendment letter was prepared by Malcolm Pirnie (July 17, 2009) and approved by the NYSDEC on July 30, 2009. A copy of the S/FMP with appended BUD amendment letter and NYSDEC approval letter is provided in Appendix B.

4.1.3 Storm-Water Pollution Prevention Plan (SWPPP)

The erosion and sediment controls for remedial construction were performed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control and the Site-specific Storm Water Pollution Prevention Plan (February 2010, Contractor Submittal No. 01412-001-C).

4.1.4 Dust Control Plan

A Dust Control Plan was prepared by the Contractor in February 2010. This plan contains a hazard evaluation which identified two primary potential dust sources during

the project. The first primary potential dust source was material excavation, handling, and staging. The second primary potential dust source was vehicular traffic. Hazard control strategies including engineering controls (e.g. covering of truck loads, wetting on-Site dirt roads and stockpiles) and administrative controls (e.g. use of Personal Protective Equipment, establishment of work zones, equipment decontamination) are also provided. The Dust Control Plan also includes air monitoring procedures followed during construction. Dust monitoring was performed during earth moving operations using a real-time dust meter which measured particulates in air in units of micrograms per cubic meter ($\mu g/m^3$) every 15 minutes. Dust measurements were collected and stored on a data logger and reviewed on a daily basis by the Contractors health and safety sub-contractor (Great Lakes Environmental & Safety Consultants, Inc.). In accordance with NYSDEC TAGM No. 4032 "Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites" (October 27, 1989), the ambient air monitoring action level was 150 $\mu g/m^3$. Appendix provides a copy of the Dust Monitoring Plan.

4.1.5 Contractors Site Operations Plans

The Remediation Engineer reviewed plans and submittals for this remedial project (i.e. those listed above plus contractor and subcontractor submittals) and confirmed that they were in compliance with the RD Remedial documents.

4.1.6 Public Participation

The following public participation activities were conducted upon completion of the Site Investigation/Remedial Action Report and prior to implementation of the Site remedy.

- A repository for documents pertaining to the Site was established.
- A public contact list, which included nearby property owners, elected officials, local media, and other interested parties, was established.
- A public meeting was held on December 3, 2005 to present and receive comments on the Preliminary Remedial Action Plan. Four comments were received and addressed at the public meeting as recorded in Attachment A of the ROD (NYSDEC, February 2005) provided in Appendix D.
- A public meeting was held on March 6, 2008 to present the preliminary design to the public for review and comment.

- A public meeting was held on February 17, 2009 to present remedial and redevelopment plans and final design documents to the public.

4.2 REMEDIAL PROGRAM ELEMENTS

4.2.1 Contractors and Consultants

- The contractor who performed the remedial and construction work was Man O'Trees, Inc. of Buffalo, New York. Their work tasks included the following:
  - Site clearing, grubbing, and removal of surface debris, and submerged automobiles from the canal.
  - Construction of underground utilities (storm and sanitary sewer, water, electric, Wi-Fi internet).
  - Installation of the Site cover system.
  - Construction of park trails, paths, pedestrian bridge, parking lots, and signage.
  - Placement of canal wall stabilization berms, canal sediment cover, and shallow water and deep-water fish habitat.
- The original certifying Engineer of Record, responsible for inspection of the work was Kent R. McManus, P.E. of Arcadis (formerly Malcolm Pirnie, Inc.) of Buffalo, New York. Malcolm Pirnie/Arcadis provided Site inspection services throughout each phase of remediation/construction and employed Wendel Duchscherer to assist with design and inspection of certain aspects of the project relating mostly to surface structures of the park such as lighting, trails, paths, benches, signs. Michael Higgins, PE of Arcadis has since reviewed, inspected, and assumed responsibility as the Engineer of Record, for the Site work previously conducted under Kent R. McManus, PE.

4.2.2 Site Preparation

- Contractor Mobilization – including field trailers and equipment began on March 1, 2010 and was completed on March 9, 2010.
- Clearing, Grubbing, and removal of surface debris, floating debris and submerged automobiles - was completed between March 17 and April 28, 2010.

- Erosion and sedimentation control via silt fencing was placed during the Site clearing operations per the SWPPP.
- Two permits were required for the project, a City of Buffalo building permit, which was obtained by the Contractor, Man O' Trees, on March 4, 2010, and a NYSDEC/United States Army Corps of Engineers (USACE) joint 401/404 Permit which was prepared by Malcolm Pirnie, Inc. The City of Buffalo received the NYSDEC Water Quality Certification on July 22, 2009, and the Nationwide Permit approval from USACE on July 21, 2009.

A pre-construction meeting was held with NYSDEC and all contractors on February 25, 2010.

State Environmental Quality Review Act requirements and substantive compliance requirements for attainment of applicable natural resource or other permits were achieved during this Remedial Action.

A NYSDEC-approved project sign was erected at the project entrance and remained in place during the Remedial Action.

4.2.3 General Site Controls

- Security: The Contractor hired a security guard who was present on-Site during evening and nighttime hours during the 2010 construction year.
- Record keeping: The Engineer's Site Inspector prepared a daily report for each day present during construction. The daily field reports include weather conditions, personnel, and equipment on-Site, and progress made that day. Also, photographs were taken to photo document field operations and project progress.
- Erosion and sedimentation controls: The contractor placed silt fencing along the entire northern Site boundary. The southern Site boundary adjoined an undeveloped and overgrown portion of the former Hanna Furnace Site which was generally of higher elevation than the project Site. Western and eastern Site boundaries were paved City Streets, Fuhrman Blvd. and Ship Canal Parkway respectively.
- Problems encountered:
    - Field trailers were burglarized on two occasions during the project.
    - Contractor heavy equipment was vandalized on one occasion.

- Metal (aluminum) parts of the boardwalk were stolen from the barge on which they were staged.

4.2.4 Nuisance controls

- Mud on roads: The contractor used fresh water from the Union Ship Canal to wash mud from equipment prior to leaving the Site. Mud tracked onto Ship Canal Parkway was removed as needed, sometimes more than once per day, using a street sweeper and/or high-pressure water spray truck.
- Dust Control was achieved using a water spray truck to wet the on-Site truck travel routes as needed.

4.2.5 Community Air Monitorin Plan (CAMP) results

Real-time air monitoring for particulates was performed during earth moving operations of Site construction. Electronic particulate measurement data was reviewed daily by the Health and Environmental Safety subcontractor (Great Lakes Environmental) and downloaded on a weekly basis. The action level of 150 $\mu g/m^3$ was exceeded at the downwind monitoring station only on rare occasions and typically for only one or two of the 15-minute spaced grab readings. The action level was exceeded one or more times on the following dates: April 1, July 6, 7, and 9, August 3, 4, 19, and 20. When the action level was exceeded, dust suppression efforts (watering of the ground surface) were increased. On one occasion, July 6, 2010, it was discovered that the exhaust of a nearby generator engine was causing the elevated readings. The dust monitoring devise was relocated to prevent future interference.

Copies of all dust monitoring field data sheets relating to the CAMP are provided in electronic format in Appendix E.

4.2.6 Reporting

Daily field reports were prepared by the Engineer/Inspector each day present during construction. All daily reports were submitted to the Department under separate cover. A photo log is included in Appendix F.

4.3 CONTAMINATED MATERIALS REMOVAL

A list of the SSALs for the contaminants of concern for this project is provided in Table 1. At the direction of the NYSDEC Project Manager, after finalization of the S/FMP, SSALs derived for adjacent Parcels 1 and 2 were used to determination if on-Site

soil/fill material moved from one on-Site location to another on-Site location was acceptable for such re-use.

A two-part figure of the locations of piled soil/fill that was sampled prior to placement elsewhere on-Site is shown on Figures 3A and 3B.

4.3.1 Solid Waste Materials

Solid waste materials including railroad ties, tires, and roofing shingles were removed from the surface of the Site early in the redevelopment effort and disposed off Site at a NYSDEC-permitted waste disposal facility. Also, Submerged automobiles were removed with participation for the City of Buffalo police department. The total count/weight of each solid waste material and destination of disposal are listed below:

Solid Waste Material	Total Weight Removed	Disposal Destination
Automobiles from the canal	#8	Scrap Yard
RR Ties	192.66 ton	Iron City Recovery
Tires	11.14 ton	Modern Landfill
Roofing	50.97 ton	Waste Management

Copies of the scale tickets, bills of lading, and/or waste manifests for each of the above waste materials is provided in Appendix G.

4.3.2 Impacted Soil/Fill Material

When encountered during construction, suspect soil/fill was segregated, sampled, and handled in accordance with provisions of the S/FMP. If analytical results of the samples indicated the presence of constituents at concentrations greater than the SSALs the subject soil/fill was removed from the Site and disposed of off Site at a permitted waste disposal facility. In cases where analytical results of suspect soil/fill did not exceed SSALs, the subject soil/fill was reused on-Site as sub-grade material in accordance with the S/FMP. A summary of samples collected, and analytical results of suspect on-Site soil/fill is provided in Table 2. Analytical data, as provided by the laboratory, for each of the suspect soil/fill samples are provided in Appendix H.

Visually stained/oily soil/fill was encountered while excavating for a 48-inch-diameter drainpipe installation on the north side of the canal. This material was segregated and sampled (Samples 1-1,3 and 2-1,3) per the S/FMP. Analytical results of these two samples indicated that the soil/fill met the SSALs and was later used as on-Site subgrade fill.

Yellow colored bricks were uncovered in an area to the northeastern corner of the Site, the brick was reused on-Site for subgrade fill after samples (On-Site Brick 1 and On-Site Brick 2) analyses confirmed constituents of concern (Resource Conservation and Recovery Act metals and silver) were below SSALs.

Impacted soil/fill that exceeded SSALs and required off-Site disposal was encountered at two locations during Site construction activities. Details of each of these encounters are provided below.

4.3.3 Blue Fill

Blue colored fill material was encountered near the approximate center of the northern boundary of the Site. This same "Blue Fill" area was originally encountered on the adjacent Parcel 4, to the north of Parcel 3, during the Site Investigation of Parcel 4 in 2006. This blue fill was tested in 2006 and found to contain elevated concentrations of cyanide, and its aerial extent was found to straddle the boundary between those two parcels. So, when this blue fill was predictably encountered on Parcel 3, the entire contiguous area of blue fill was further delineated (visually), sampled, and removed, from both parcels. The total footprint area of the blue fill removal is estimated at 9,000 square feet with an average estimated thickness of blue fill and overlying soil removed of 1.5 feet. A total of 332.05 tons of blue fill was removed from Parcel 3 and disposed of off Site at a permitted waste disposal facility (Waste Management's Chafee landfill). From Parcel 4 at total of 560 tons of blue fill was removed and disposed at the same off-Site waste disposal facility. The location and footprint shape of the blue fill removal area is provided on Figure 4A. Waste manifests and scale tickets relating to the disposal of the blue fill are provided in Appendix G. Excavation sidewall and bottom samples were collected to characterize conditions after completion of the removal action. A listing of samples collected of the blue fill and their analytical results are provided in Table 3.

4.3.4 SERR -1

The second instance of removal of impacted soil/fill occurred in the area near the southeast corner of the canal, near the end of the promenade railroad track (SERR), see Figure 4B. Soil/fill that was being removed to establish subgrade elevation in this area showed visual evidence of potential contamination. This material was sampled per the S/FMP (sample number SERR-1). Results of the characterization sample exceeded SSALs for arsenic and chromium and therefore this material was removed from the Site and disposed at a NYSDEC-permitted solid waste disposal facility, see Appendix G for waste profile and manifest documentation.

4.3.5 On-Site Reuse

To achieve the design subgrade elevations, on-Site soil/fill was excavated from certain areas of the Site and relocated to other areas on-Site. Once disturbed on-Site soil/fill was excavated and loaded for intended relocation, it was temporarily stock piled on-Site and sampled per the requirements of the S/FMP. Stockpiles of up to 2000 cubic yards were sampled and compared to SSALs. All soil/fill sampled for relocation purposes was acceptable based on analytical results. Table 4 provides a listing of samples collected and analytical results compared to SSALs. Figures 3A and 3B provide the locations of the soil/fill piles sampled.

4.4 REMEDIAL PERFORMANCE/DOCUMENTATION SAMPLING

Per the ROD and S/FMP, performance sampling was not performed as part of the Site remediation.

4.5 IMPORTED BACKFILL

4.5.1 Sub-Grade Soil/Fill

Subgrade surface elevation was achieved primarily by removing soil/fill from on-Site high areas and placing it at on-Site low areas as shown on the Design Drawings. Analytical testing was performed as part of the sub-grade movement as described in Section 4.3.2. Once all high areas had been reduced to design grade, additional soil/fill material was needed to achieve the design grade Site-wide. The sub-grade shortage was addressed by using soil/fill material available in a large pile located approximately 300 feet east of the Site, across Ship Canal Parkway. This “East Pile” was sampled per the provisions of the S/FMP and, based on analytical results which were below SSALs, was used as a source of on-Site sub-grade. The east pile was created from soil/fill generated during Phase 2 of the BLCP road construction. Table 4 includes the samples collected from the East Pile and the analytical results of those samples.

4.5.2 Landside Clean Soil Cover System Components

The required 1-foot thick landside soil cover is made of a mixture of two primary components, clean soil, and water treatment residuals. A description of each of these two components is provided below.

4.5.3 Clean Cover Soil

Approximately 75% of the site cover is composed of clean soil from various off-Site sources of native soil. Each source was sampled per the requirements of the S/FMP and the resulting analytical data were compared to commercial use Soil Cleanup Objectives (SCOs) see Table 5. A total of eight samples of potential cover soil were collected for characterization. A summary of analytical results is provided in Table 6.

The thickness of the cover was determined following its placement and was generally found to be between 12 and 24 inches thick, with an average site cover thickness of 20 inches. Details of the methods and findings from this determination can be found in the Cap Verification Work Summary (August, 2016), located in Appendix K. Additional details regarding the modification of the 2-foot thick requirement mentioned in Section 2.2 can be found in the "Explanation of Significant Differences (February, 2017), located in Appendix L.

4.5.4 Water Treatment Residuals

Approximately 25% of the volume of the clean soil cover system is composed of residual solids from water treatment by the Erie County Water Authority at Sturgeon Point. These residuals have been extensively tested and were approved for use as a component of the cover system through the issuance of a BUD dated July 17, 2009. A copy of the BUD amendment letter is included in the S/FMP provided in Appendix B. The BUD amended soil was sampled after mixing per the frequency specified in the BUD amendment letter to confirm the mixture met the commercial use Soil Cleanup Objective for arsenic (16 PPM). A total of 95 confirmatory samples were collected for arsenic analysis. BUD material was not used in the 1-foot clean soil cover over the five soil mounds located on the south side of the canal. Therefore, confirmatory sampling was not performed on the mound cover soils.

In addition, the BUD-amended soil was sampled at a lesser frequency for a much broader list of parameters per the BUD amendment agreement. Four samples were collected of the BUD-amended soil and analyzed for Target Compound List, Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), pesticides, Polychlorinated biphenyls (PCBs), Target Analyte List metals, cyanide, and pH. Table 7 provides a summary of analytical results of these samples. Once confirmed to be compliant with the commercial use SCO, a topographic survey was performed on the clean soil cover (see Appendix K). The BUD-amended soil was covered by 6 inches of clean topsoil to complete the required minimum, 12-inch thick cover. The cover

thickness was verified post-construction through soil borings. Details of the cap verification efforts can be found in the Cap Verification Work Summary located in Appendix K.

4.5.5 Canal Wall Stabilization Berm and Canal Sediment Cover

Bottom sediments of the entire 1900 feet long eastern end of the Union Ship Canal were covered with a minimum 1-foot thick layer of clean sand and gravel. Prior to placement of the clean sand sediment cover, a geotextile layer was placed over the canal sediments to prevent displacement and mixing of the underlying contaminated sediment with the new clean sand cover material. The clean sand sediment cover material was placed on top of the geotextile using a stone slinger truck and the thickness checked by a diver.

4.6 CONTAMINATION REMAINING AT THE SITE

Based on historic sampling, as well as sampling performed during Site remediation and construction operations, low levels (concentrations above commercial use SCOs) of contamination are known to remain on-Site in the subgrade soil/fill beneath the 1-foot thick clean cover. The remaining contaminants are primarily metals and SVOCs. However, no known remaining on-Site soil/fill exceeds SSALs. An orange mesh demarcation layer was placed at the sub-grade/clean cover interface. Utility trenches were backfilled with clean crushed stone. The thickness of subgrade material is limited on-Site south of the canal due to the 2.5 to 3.0 feet thick reinforced concrete slab that remains from historical Site use.

Also, sediments known to contain SVOC, metal, and PCB contaminants remain in the canal beneath the 1-foot thick clean sediment cover.

Because contaminated soil remains beneath the Site after completion of the Remedial Action, Institutional and Engineering Controls are required to protect human health and the environment. These ECs/ICs are described in the following sections. Long-term management of these EC/ICs and residual contamination will be performed under the SMP approved by the NYSDEC.

4.7 SOIL COVER SYSTEM

Exposure to remaining contamination in soil/fill at the Site is prevented by a soil cover system placed over the Site. This cover system is comprised of a minimum of 12 inches of clean soil, asphalt pavement, concrete-covered sidewalks, and concrete building

slabs. An Excavation Work Plan, which outlines the procedures required in the event the cover system and/or underlying residual contamination are disturbed, is provided in Appendix A of the SMP.

Procedures for monitoring and maintaining the Site cover system are provided in the PRR Section 3 of the SMP. The PRR also addresses inspection procedures that must occur on a regular basis as specified in the SMP.

4.8 INSTITUTIONAL CONTROLS

The Site remedy requires that an EE be placed on the property to (1) implement, maintain, and monitor the Engineering Control; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the Site to passive recreational areas only (i.e., parks) without areas such as playgrounds and athletic fields.

The EE for the Site was executed by the Department on April 11, 2013 and filed with the Erie County Clerk on May 13, 2013. The County Recording Identifier number for this filing is 2013111889. A copy of the easement and proof of filing is provided in Appendix I of this FER.

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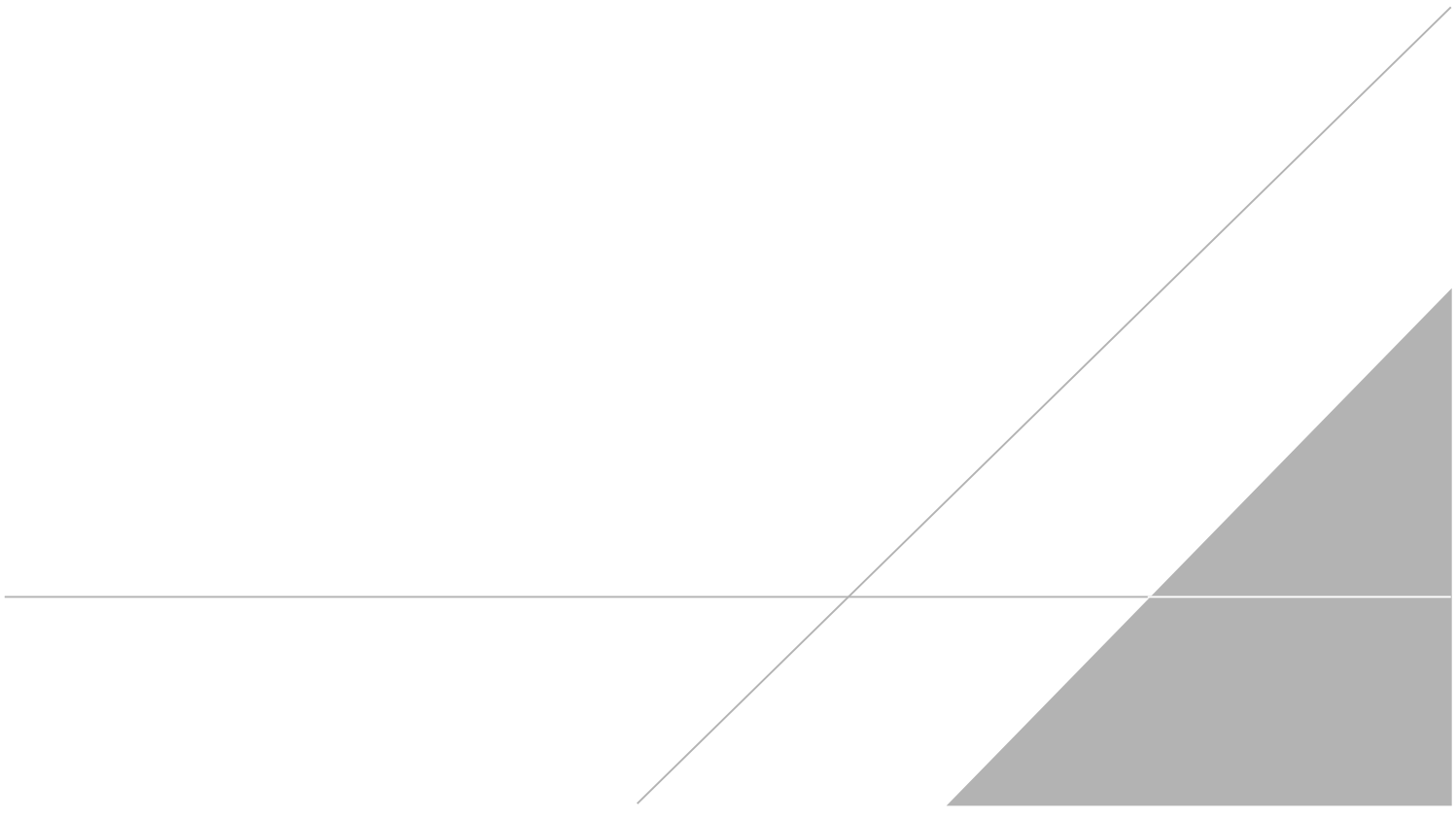

Table 1
Site-Specific Action Level for Subgrade Soil/Fill

Parameter	SSAL
Volatile Organic Compounds (µg/kg)	
- Total VOCs)	10,000[1]
Semi-Volatile Organic Compounds (µg/kg)	
- Total SVOCs	500,000[1,2]
Pesticides/PCBs (µg/kg)	
- Total Pesticides	10,000[1]
- Total PCBs (surface 0-1')	1,000
- Total PCBs (surface below 1')	10,000
Metals (mg/kg)	
- Arsenic	50
- Barium	500
- Cadmium	20
- Chromium	200
- Lead	1,000
- Mercury	1.0
- Selenium	50
- Silver	1,000
- Cyanide	50
pH (S.U.)	
pH triggering restricted soil/fill use	9.0 to 12.5
pH triggering "hazardous" soil/fill characterization	>12.5

Notes:
1 = Total concentration is the sum of concentrations of Target Compound List (TCL) compounds plus estimated concentrations of Tentatively Identified Compounds (TICs).

2 = In addition to SSALs of 500,000 µg/kg for total concentration of SVOCs, the SSAL for each individual SVOC is 50,000 µg/kg.

Table 2
Summary of Analytical Results
On-Site Suspect Fill Materials

Sample ID	SSAL	Onsite Brick 1	Onsite Brick 2	Suspect Solid 2.1	Blue Fill	Mixed S (C18-75)	Dark S (C18+75)	SERR-1
Sample Collection Date		4/8/2010	4/8/2010	3/31/2010	4/1/2010	6/14/2010	6/14/2010	6/15/2011
Metals (mg/kg)								
Arsenic	50	0.484		10.2	-	10.2	11.6	64.7
Barium	500	4.96	2.72	360	-	117	120	45
Cadmium	20					0.893	1.76	4.05
Chromium	200			11	-	8.68	10.3	771
Lead	1000		1.51	15.1	-	110	93.7	186
Mercury	1						0.0168	0.06
Selenium	50							
Silver	1000							
Total Cyanide(TCN)	50			20	-	1.3	1.7	1
Other								
TCLP Chromium	NA	-	-	-		-	-	-
TCLP Lead	NA	-	-	-		-	-	-
Reactive Cyanide	NA	-	-	-		-	-	-
pH (pH triggering restricted soil/fill use)	9.0 to 12.5	-	-	11.09	-	9.24	9.78	7.71
pH (triggering "hazardous" soil/fill characterization)	> 12.5	-	-		-	-	-	
Pesticides (ug/kg)								
Total Pesticides	10,000	-	-		-			90
PCBs (ug/kg)								
Total PCBs (Surface 0-1 foot)	1,000	-	-		-			-
Total PCBs (Below 1 foot)	10,000	-	-		-			15.7
TCL Semi-Volatile (ug/kg)								
Total SVOCs	500,000	-	-		-	2.1	1.4	187000
TCL Volatiles (ug/kg)								
Total VOCs	10000 [1]	-	-	0.187	-	0.046	0.3	500

Notes:
1 = Total concentration of VOCs is the sum of concentrations of Target Compound List (TCL) compounds
plus estimated concentrations of Tentatively Identified Compounds (TICs).
2 = In addition to SSAL of 500,000 µg/kg for total concentration of SVOCs, the SSAL for each individual SVOC is 50,000 µg/kg.
Only those analytes detected at a minimum of one location are shown.
(-) dash indicates not analyzed for this parameter.
Blank cells indicate non-detect.
Yellow shaded cells contain concentration greater than the SSAL.

Table 3

Analytical Results of Blue Fill Post-Excavation Confirmation Samples

Sample ID	Date Sampled	Cyanide (mg/kg)
B1 Bottom	4/26/2010	76
B2 Bottom	4/26/2010	14
B3 Bottom	4/26/2010	130
B4 Bottom	4/26/2010	25
B5 Bottom	4/26/2010	15
B6 Bottom	4/26/2010	42
B7 Bottom	4/26/2010	20
B8 Bottom	4/26/2010	45
NWCL (corner)	4/26/2010	8.7
N Wall 2	4/26/2010	7.1
N Wall 3	4/26/2010	11
E Wall 4	4/26/2010	14
E Wall 5	4/26/2010	15
S Wall 6	4/26/2010	14
S Wall 7	4/26/2010	15
S Wall 8	4/26/2010	25
W Wall 9	4/26/2010	13
W Wall 10	4/26/2010	11
W Wall 11	4/26/2010	39

Notes:

Shaded value indicates exceedance of restricted residential SCO of 27 mg/kg.

Table 4
Summary of Analytical Results
On-Site Subgrade Material

			On-Site Soil/Fill Material						East and North Piles							
Sample ID	**SSALs**	**Stockpile NW Corner 3-1,3-3**	**C16+20**	**C09+00 (1,3)**	**C10+00 (1,3)**	**C13+50 (1,3)**	**C9+00 (1,3)**	**C16+75 (1,3)**	**East Pile 1-1**	**East Pile 2-1**	**East 1-1,3**	**East 2-1,3**	**East 3-1,3**	**N 1-1,3**	**N 2-1,3**	**N 3-1,3**
Sample Collection Date		3/31/2010	4/8/2010	4/12/2010	4/12/2010	4/14/2010	4/14/2010	4/14/2010	5/19/2010	5/19/2010	4/29/2010	4/29/2010	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Metals (mg/kg)																
Total Cyanide(TCN)	50	1.6					8.3		3.1		2.6	1.3		3.9	5.2	6
Arsenic	50	8.35	13	13.5	10.9	19.1	14.2	9.64	11.1	16.6	8.22	8.32	11.1	18.3	14.5	14
Barium	500	44.2	105	152	104	153	108	196	84.4	120	85.7	74	95	149	142	147
Cadmium	20									0.94	1.05	0.67	0.98	1.55	1.26	1.35
Chromium	200	24.7	22.8	60.7	25.8	27.8	21.9	56.9	13.1	13.9	18.1	19.7	28.4	26.7	282	27.7
Lead	1000	110	117	121	102	130	124	171	101	293	113	118	140	168	156	140
Mercury	1															0.06
Other																
pH (pH triggering restricted soil/fill use)	9.0 to 12.5	8.42	8.59	9.48	8.68	8.57	8.94	8.65	8.61	8.22	7.58	7.84	7.87	8.3	8.32	8.37
pH (triggering “hazardous” soil/fill characterization)	> 12.5															
PCBs (ug/kg)																
Total PCBs (Surface 0-1 foot)	1,000															
Total PCBs (Below 1 foot)	10,000												0.02	0.04	0.04	0.02
Pesticides																
Total pesticides	10000		0.07	0.00	0.01	0.00	0.04	0.00			7.58	7.84	7.89	8.34	8.36	8.45
TCL Semi-Volatile (ug/kg)																
Total SVOCs	500000		2.13	6.35	8.72	5.45	1.82	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TCL Volatiles (ug/kg)																
Total VOCs	10000	0.07	0.00	0.18	0.01	0.18	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes:
Only those analytes detected at a minimum of one location are shown.
Blank cells indicate non-detect.

Table 5
Soil Cleanup Objectives (SCOS) for Imported Soil/Fill
Union Ship Canal Public Open Space - Parcel 3

Contaminant	Protection of Public Health
	Commercial or Industrial Use
Metals	
Arsenic	16
Barium	400
Beryllium	47
Cadmium	7.5
Chromium, hexavalent[a]	19
Chromium, trivalent[a]	1500
Copper	270
Cyanide	27
Lead	450
Manganese	2000
Total Mercury	0.73
Nickel	130
Selenium	4
Silver	8.3
Zinc	2480
PCBs/Pesticides	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	17
4,4'-DDT	47
4,4'-DDD	14
Aldrin	0.19
alpha-BHC	0.02
beta-BHC	0.09
Chlordane (alpha)	2.9
delta-BHC	0.25
Dibenzofuran	210
Dieldrin	0.1
Endosulfan I	102
Endosulfan II	102
Endosulfan sulfate	200
Endrin	0.06
Heptachlor	0.38
Lindane	0.1
Polychlorinated biphenyls	1

Table 5
Soil Cleanup Objectives (SCOS) for Imported Soil/Fill
Union Ship Canal Public Open Space - Parcel 3

Contaminant	Protection of Public Health
	Commercial or Industrial Use
Semivolatiles	
Acenaphthene	98
Acenapthylene	107
Anthracene	500
Benz(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1.7
Benzo(g,h,i)perylene	500
Benzo(k)fluoranthene	1.7
Chrysene	1
Dibenz(a,h)anthracene	0.56
Fluoranthene	500
Fluorene	386
Indeno(1,2,3-cd)pyrene	5.6
m-Cresol	0.33[b]
Naphthalene	12
o-Cresol	0.33[b]
p-Cresol	0.33
Pentachlorophenol	0.8[b]
PFOA (Commercial Only)	0.5
PFOA (Industrial Only)	0.6
PFOS	0.44
Phenanthrene	500
Phenol	0.33[b]
Pyrene	500

Table 5
Soil Cleanup Objectives (SCOS) for Imported Soil/Fill
Union Ship Canal Public Open Space - Parcel 3

Contaminant	Protection of Public Health
	Commercial or Industrial Use
Volatiles	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
cis-1,2-Dichloroethene	0.25
trans-1,2-Dichloroethene	0.19
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1[b]
Acetone	0.05
Benzene	0.06
Butylbenzene	12
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethylbenzene	1
Hexachlorobenzene	3.2
Methyl ethyl ketone	0.12
Methyl tert-butyl ether	0.93
Methylene chloride	0.05
n-Propylbenzene	3.9
sec-Butylbenzene	11
tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
Trichloroethene	0.47
1,2,4-Trimethylbenzene	3.6
1,3,5- Trimethylbenzene	8.4
Vinyl chloride	0.02
Xylene (mixed)	1.6

Table 5
Soil Cleanup Objectives (SCOS) for Imported Soil/Fill
Union Ship Canal Public Open Space - Parcel 3

Notes:

All soil cleanup objectives (SCOs) are in parts per million (ppm).

a The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.

b For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.

Table 6
Summary of Analytical Results
Off-Site Borrow Soil Material

Sample ID	Restricted Residential SCO	Ganson St. Pile 1-2,3	Ganson St. Pile 2-2,3	Hopkins St. /1	Devinney Rd. C16+50/1	Ganson St. Pile 1-1,3	Ganson St. Pile 2-1,3	Hopkins Stockpile 1-1,3	Hopkins Stockpile 2-1	DVin1-1/3	DVin2-1/3	DVin3-1/3	DVin4-1/3	Ganson 1-1/3	Ganson 2-1/3	N1-1/3	S1-1/3	Hamb1-1/2	Hamb2-1/2
Soil Descriptiion		Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil	Clean Soil
Date Sampled		4/1/2010	4/1/2010	4/14/2010	4/15/2010	7/6/2010	7/6/2010	7/13/2010	7/13/2010	4/15/2011	4/15/2011	4/15/2011	4/15/2011	6/15/2011	6/15/2011	6/15/2011	6/15/2011	6/15/2011	6/15/2011
Metals (mg/kg)																			
Total Cyanide	27							0.62						0.62		3.3	4.6		
Aluminum	NI	9,060	9,830	10,300	11,500	12,500	15,700	15,800	13,900	15300	14700	15200	15200	10200	9300	14700	17900	9140	6830
Arsenic	16	6.04	5.39	5.02	5.56	6.14	5.69	8.25	9	10.9	11	10.9	10.5	5.5	7.27	9.43	8.98	5.31	2.8
Barium	400	76	72	70	68	85.2	90.3	83.5	84.9	48.3	44.7	48.3	45.4	70.2	58.5	123	148	69.2	51.6
Beryllium	47	0.647	0.866	0.43		0.611	0.624	0.763	0.812	0.6	0.551	0.586	0.524	0.534	0.513	2.33	2.8	0.486	0.361
Cadmium	4.3							0.758	0.398				0.483			0.622	0.645		
Calcium	NI	104,000	138,000	6,150	3,670	16,600	12,700	9,410	15,300	4090	2750	3420	2390	36000	27400	97900	121000	46400	49900
Chromium	19	12.8	11.8	13	12.5	16.5	18.7	21	18.1	15.5	15.1	15.5	16	14	13.3	18.6	18.5	15.1	9.43
Cobalt	NI	4.27	4.93	6.12		8.18	8.77	13.5	11.2	8.9	9.13	9.19	8.62	7.65	8.43	8.15	7.1	6.89	5.06
Copper	270	26.1	17.2	18.1	18.1	32.5	15.8	30	31.6	23.5	22.1	22.5	23.4	21.9	23.4	44.5	31.8	22.9	11.2
Iron	NI	11,700	10,700	15,000	27,900	19,600	21,800	29,200	28,200	23900	23200	23100	23300	17700	20000	45300	45300	16400	11600
Lead	400	49.2	33.6	14.3	12.1	61.8	37	16.4	19.1	16.2	14.9	14.1	16.2	29.7	15.7	89.1	70.1	42.3	13.3
Magnesium	NI	11,200	15,500	3,080	4,350	6,840	6,420	5,580	5,750	3350	3020	3320	2890	13200	10500	14800	11100	17900	20700
Manganese	2,000	483	571	387	496	493	496	479	479	621	598	647	595	364	365	1730	2200	401	321
Mercury	0.73	0.01	0.03	0.03	0.02	0.09	0.06	0.03	0.03	0.06	0.049	0.055	0.059	0.046	0.025		0.009	0.02	0.026
Nickel	130	11.3	10.9	18.8	26.4	19.2	16.7	37.9	33.5	16.4	15.9	16	15.2	18.7	21.7	19.9	18.2	15.3	9.78
Potassium	NI	1,550	1,450	1,040	937	1,380	1,760	1,880	1,470	1160	1120	1170	1130	2110	1600	1900	1870	1950	1910
Sodium	NI	454	519	1,530		320		791	872					711	1360	438	481	268	317
Vanadium	NI	17.9	18.7	21.5		25.6	32.2	26	23.7	24.5	24	24	24.7	22.2	21.4	19.8	18.5	21.7	19
Zinc	2,480	73.8	61.5	60	82.5	113	109	97.7	103	75.9	73.7	74.5	74.5	72.7	62	369	328	106	62
Other																			
pH	>2<12.5									7.4	7.29	-	-	8.21	8.25	8.69	9.91	8.21	8.42
PCBs (mg/kg)																			
Aroclor 1260	1																		
Pesticides (mg/kg)																			
alpha-chlordane	4.2																0.01		
delta-BHC	0.25																		
4,4'-DDD	13	0.00					0.00												
4,4'-DDE	8.9	0.00	0.02				0.01			0.008	0.007	0.006	0.01						
4,4'-DDT	7.9	0.01	0.03			0.00	0.01			0.007	0.005	0.005	0.008					0.003	
Methoxychlor	NI					23.60	0.01										0.01		
TCL Semi-Volatiles (mg/kg)																			
Anthracene	100	0.18				0.20												0.165	
benzo(a)pyrene	1													0.2				0.5	
Benzo (a) anthracene	1	0.50	0.32			0.45								0.2	0.2			0.5	
Benzo (b) fluoranthene	1	0.48	0.33			0.42								0.2	0.2			0.5	
Benzo (g,h,I) perylene	100	0.37	0.27			0.28												0.3	
Benzo (k) fluoranthene	1.7	0.33	0.21			0.29								0.2				0.4	
Chrysene	1	0.56	0.35			0.47								0.2	0.2			0.5	
Fluoranthene	100		0.64	0.20		1.05	0.23							0.5	0.4	0.2	0.2	0.9	0.2
Indeno (1,2,3-cd) pyrene	0.5	0.23	0.17			0.22												0.3	
Phenanthrene	100	0.58	0.34			0.88	0.19							0.4	0.3			0.4	
Pyrene	100	0.95	0.56	0.18		0.91	0.21							0.4	0.3	0.2	0.2	0.8	0.2
TCL Volatiles (mg/kg)																			
Acetone	0.05							0.02											
Cabon disulfide	NI																0.005		
Chloroform	0.37					0.00													
Dichlorodifuoromethane	NI	0.03	0.02																
Ethylbenzene	1					0.00													
methylcyclohexane	NI																0.01		
Methylene chloride	0.05																		
Tetrachloroethene	1.3	0.00	0.00																
Toluene	0.7					0.00													
Trichlorofluorpmethane	NI	0.00																	
m,p-Xylene	1.6					0.01	0.00												
o-Xylene	1.6					0.00													

Notes:
Only those analytes detected at a minimum of one location are shown.
Blank cells indicate non-detect.
Shaded value indicates exceedance of resricted residential SCO.

Table 7
Analytical Results of Residuals Amended (BUD) Soil

Sample ID	Restricted Residential SCO	B1k-1/3	B2k-1/3	S1/S3	E BUD 1-1/1-3	Test 1	Test 2-1	Test 2-2	Test 2-3	Test 2-4	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17
Soil Describtion		North Side	North Side	South Side	East Side	North-Test Patch	North-Test Patch	North-Test Patch	North-Test Patch	North-Test Patch	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North
Date Sampled		7/13/2010	7/13/2010	4/13/2011	7/15/2011	6/15/2010	6/18/2010	6/18/2010	6/18/2010	6/18/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010
Metals (mg/kg)																											
Total Cyanide	27			0.82																							
Aluminum	NI	22,200	22,400	17,400	23,800																						
Arsenic	16	14.3	16.3	11.4	13	12.3	10.4	11.4	12.2	11.9	11.5	11.6	15	12.2	8.73	9.25	9.02	13.3	13	14	12.6	12.1	13.4	14.1	14.8	13.9	13.5
Barium	400	76.5	90.2	72.3	72.3																						
Beryllium	47	0.661	0.942	0.69	0.564																						
Cadmium	4.3				0.472																						
Calcium	NI	32,500	40,500	38,300	30,500																						
Chromium	19	23	24	18.1	25.7																						
Cobalt	NI	9.54	8.98	7.95	8.53																						
Copper	270	44.5	44.7	33	44.7																						
Iron	NI	24,100	27,400	20,500	20,600																						
Lead	400	30.2	45.5	22.7	52.9																						
Magnesium	NI	7,240	7,530	6,540	7,090																						
Manganese	2,000	980	1,040	829	949																						
Mercury	0.73	0.015	0.037	0.04	0.099																						
Nickel	130	28.7	28.7	22.2	27																						
Potassium	NI	1,830	1,710	1,460	1,720																						
Sodium	NI	168	215		182																						
Vanadium	NI	22.2	20.5	18.4	20.7																						
Zinc	2,480	113	118	95.3	124																						
Other																											
pH	>2<12.5	7.86	7.88	7.91	7.09																						
PCBs (mg/kg)																											
Aroclor 1260	1	0.028			0.059																						
Pesticides																											
alpha-BHC	0.48				0.002																						
delta-BHC	0.25	0.002	0.002	0.004	0.003																						
4,4'-DDD	13	0.004	0.004																								
4,4'-DDE	8.9	0.002	0.003																								
4,4'-DDT	7.9	0.003	0.004		0.004																						
Endrin Aldehyde	11				0.002																						
Methoxychlor	NI																										
beta-BHC	0.36			0.007																							
TCL Semi-Volatile Organics (mg/kg)																											
Anthracene	100																										
Benzo (a) anthracene	1																										
Benzo (b) fluoranthene	1																										
Benzo (g,h,I) perylene	100																										
Benzo (k) fluoranthene	1.7																										
Chrysene	1																										
Fluoranthene	100		0.285																								
Indeno (1,2,3-cd) pyrene	0.5																										
Phenanthrene	100																										
Pyrene	100		0.219																								
methylene chloride																											
TCL Volatiles (mg/kg)																											
Acetone	0.05																										
Cabon disulfide	NI	0.007	0.005																								
Chloroform	0.37	0.007	0.009																								
Dichlorodifuoromethane	NI																										
Ethylbenzene	1	0.002	0.003																								
Methylene chloride	0.05	0.008	0.007		0.024																						
Tetrachloroethene	1.3																										
Toluene	0.7				0.006																						
Trichlorofluorpmethane	NI																										
m,p-Xylene	1.6	0.003	0.003																								
o-Xylene	1.6	0.003	0.003																								

Notes:
Shaded value indicates exceedance of restricted residential SCO (16 PPM).

Table 7
Analytical Results of Residuals Amended (BUD) Soil

Sample ID	Restricted Residential SCO	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28	B29	B30	B31	B32	B33	B34	B35	B36	B37	B38	B39	B40	B41	B42	B43	B44	B45
Soil Describtion		North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North	North
Date Sampled		7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/1/2010	7/13/2010	7/13/2010	7/13/2010	7/13/2010	7/13/2010	7/13/2010
Metals (mg/kg)																													
Total Cyanide	27																												
Aluminum	NI																												
Arsenic	16	8.78	11.9	15.7	13.3	14	12.9	14	11.4	12.8	12	14.6	8.08	8.56	11.8	5.31	14.8	3.53	6.37	9.37	9.15	8.62	10.7	11.5	14.1	13.6	13.4	13.7	16.1
Barium	400																												
Beryllium	47																												
Cadmium	4.3																												
Calcium	NI																												
Chromium	19																												
Cobalt	NI																												
Copper	270																												
Iron	NI																												
Lead	400																												
Magnesium	NI																												
Manganese	2,000																												
Mercury	0.73																												
Nickel	130																												
Potassium	NI																												
Sodium	NI																												
Vanadium	NI																												
Zinc	2,480																												
Other																													
pH	>2<12.5																												
PCBs (mg/kg)																													
Aroclor 1260	1																												
Pesticides																													
alpha-BHC	0.48																												
delta-BHC	0.25																												
4,4'-DDD	13																												
4,4'-DDE	8.9																												
4,4'-DDT	7.9																												
Endrin Aldehyde	11																												
Methoxychlor	NI																												
beta-BHC	0.36																												
TCL Semi-Volatile Organics (mg/kg)																													
Anthracene	100																												
Benzo (a) anthracene	1																												
Benzo (b) fluoranthene	1																												
Benzo (g,h,I) perylene	100																												
Benzo (k) fluoranthene	1.7																												
Chrysene	1																												
Fluoranthene	100																												
Indeno (1,2,3-cd) pyrene	0.5																												
Phenanthrene	100																												
Pyrene	100																												
methylene chloride																													
TCL Volatiles (mg/kg)																													
Acetone	0.05																												
Cabon disulfide	NI																												
Chloroform	0.37																												
Dichlorodifuoromethane	NI																												
Ethylbenzene	1																												
Methylene chloride	0.05																												
Tetrachloroethene	1.3																												
Toluene	0.7																												
Trichlorofluorpmethane	NI																												
m,p-Xylene	1.6																												
o-Xylene	1.6																												

Notes:
Shaded value indicates exceedance of restricted resi

Table 7
Analytical Results of Residuals Amended (BUD) Soil

Sample ID	Restricted Residential SCO	B46	B47	B48	B49	B50	B51	GLESC-1	GLESC-2	GLESC-3	GLESC-4	GLESC-5	GLESC-6	GLESC-7	GLESC-8	GLESC-9	GLESC-10	GLESC-11	GLESC-12	GLESC-13	GLESC-14	GLESC-15	GLESC-16	GLESC-17	GLESC-18	GLESC-19
Soil Describtion		North	North	North	North	North	North	South	South	South	South	South	South	South	South	South	South	South	South	South	South	South	South	South	South	South
Date Sampled		7/13/2010	7/13/2010	7/13/2010	7/13/2010	7/13/2010	7/13/2010	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011
Metals (mg/kg)																										
Total Cyanide	27																									
Aluminum	NI																									
Arsenic	16	12.2	11.8	15	13.5	12.5	10.8	10.1	15.5	13.9	11.4	9.95	14.7	11.4	10	15.1	9.05	14.7	14.6	9.52	8	13.8	13.7	11.6	14.9	10.3
Barium	400																									
Beryllium	47																									
Cadmium	4.3																									
Calcium	NI																									
Chromium	19																									
Cobalt	NI																									
Copper	270																									
Iron	NI																									
Lead	400																									
Magnesium	NI																									
Manganese	2,000																									
Mercury	0.73																									
Nickel	130																									
Potassium	NI																									
Sodium	NI																									
Vanadium	NI																									
Zinc	2,480																									
Other																										
pH	>2<12.5																									
PCBs (mg/kg)																										
Aroclor 1260	1																									
Pesticides																										
alpha-BHC	0.48																									
delta-BHC	0.25																									
4,4'-DDD	13																									
4,4'-DDE	8.9																									
4,4'-DDT	7.9																									
Endrin Aldehyde	11																									
Methoxychlor	NI																									
beta-BHC	0.36																									
TCL Semi-Volatile Organics (mg/kg)																										
Anthracene	100																									
Benzo (a) anthracene	1																									
Benzo (b) fluoranthene	1																									
Benzo (g,h,I) perylene	100																									
Benzo (k) fluoranthene	1.7																									
Chrysene	1																									
Fluoranthene	100																									
Indeno (1,2,3-cd) pyrene	0.5																									
Phenanthrene	100																									
Pyrene	100																									
methylene chloride																										
TCL Volatiles (mg/kg)																										
Acetone	0.05																									
Cabon disulfide	NI																									
Chloroform	0.37																									
Dichlorodifuoromethane	NI																									
Ethylbenzene	1																									
Methylene chloride	0.05																									
Tetrachloroethene	1.3																									
Toluene	0.7																									
Trichlorofluorpmethane	NI																									
m,p-Xylene	1.6																									
o-Xylene	1.6																									

Notes:
Shaded value indicates exceedance of restricted resi

Table 7
Analytical Results of Residuals Amended (BUD) Soil

Sample ID	Restricted Residential SCO	GLESC-20	GLESC-21	GLESC-22	GLESC-23	GLESC-24	NE1	NE2	NE3	NE4	NE5	NE6	E7	E8	E9	E10	E11	E12	E13	E14	E15
Soil Describtion		South	South	South	South	South	East	East	East	East	East	East	East	East	East	East	East	East	East	East	East
Date Sampled		4/13/2011	4/13/2011	4/13/2011	4/13/2011	4/13/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011
Metals (mg/kg)																					
Total Cyanide	27																				
Aluminum	NI																				
Arsenic	16	12.6	10.7	15.5	11.7	15.4	9.79	12	9.7	9.56	10.1	13.2	10.4	10.1	11.2	10.8	14.4	10.5	12.1	11.1	13
Barium	400																				
Beryllium	47																				
Cadmium	4.3																				
Calcium	NI																				
Chromium	19																				
Cobalt	NI																				
Copper	270																				
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Toluene	0.7																				
Trichlorofluorpmethane	NI																				
m,p-Xylene	1.6																				
o-Xylene	1.6																				

Notes:
Shaded value indicates exceedance of restricted resi

Figures

ARCADIS

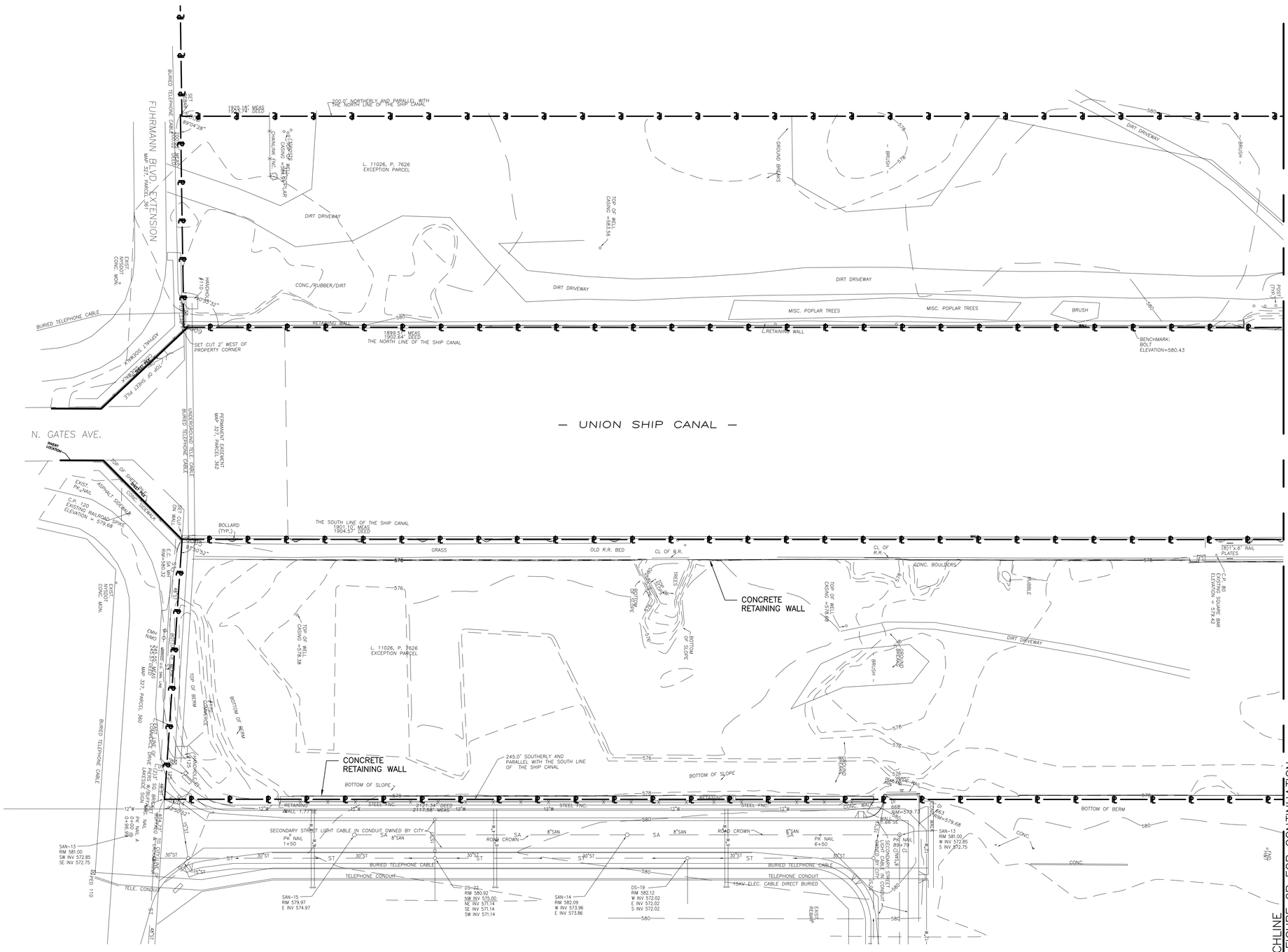
4080007 NOVEMBER 2011

BUFFALO LAKESIDE COMMERCE PARK (PARCEL 3)

BUFFALO, NEW YORK

FIGURE 1

SITE LOCATION MAP



LEGEND:

- PROPERTY LINE
- PROJECT LIMIT LINE
- 578 — EXISTING CONTOUR
- 576.03 — EXISTING SPOT ELEVATION
- 578 — PROPOSED CONTOUR
- SF — EXISTING SILT FENCE / STRAW BALE DIKE

NOTES:

1. CONTRACTOR MAY RE-UTILIZE REMAINING SILT FENCE AND OTHER BMP'S LEFT FROM PREVIOUS GRADING CONTRACTS AS APPROPRIATE. CONTRACTOR SHALL BE RESPONSIBLE FOR REFURBISHING, AS APPROPRIATE ANY SILT FENCE PROPOSED FOR REUSE.
2. CONTRACTOR SHALL UTILIZE DESIGNATED CONSTRUCTION ENTRANCES TO ACCESS THE SITE UNLESS APPROVED BY ENGINEER.
3. CONTRACTOR SHALL CONTACT DON POLITO WITH CITY OF BUFFALO DPW (851-5359) PRIOR TO REMOVAL OF SUBMERGED VEHICLES FROM CANAL. THIS EFFORT WILL BE COORDINATED THROUGH THE BUFFALO POLICE DEPARTMENT.

50 0 50 100
SCALE: 1" = 100'

ARCADIS

BUFFALO URBAN DEVELPOMENT CORPORATION

UNION SHIP CANAL OPEN SPACE PARCEL 3 DEVELOPMENT

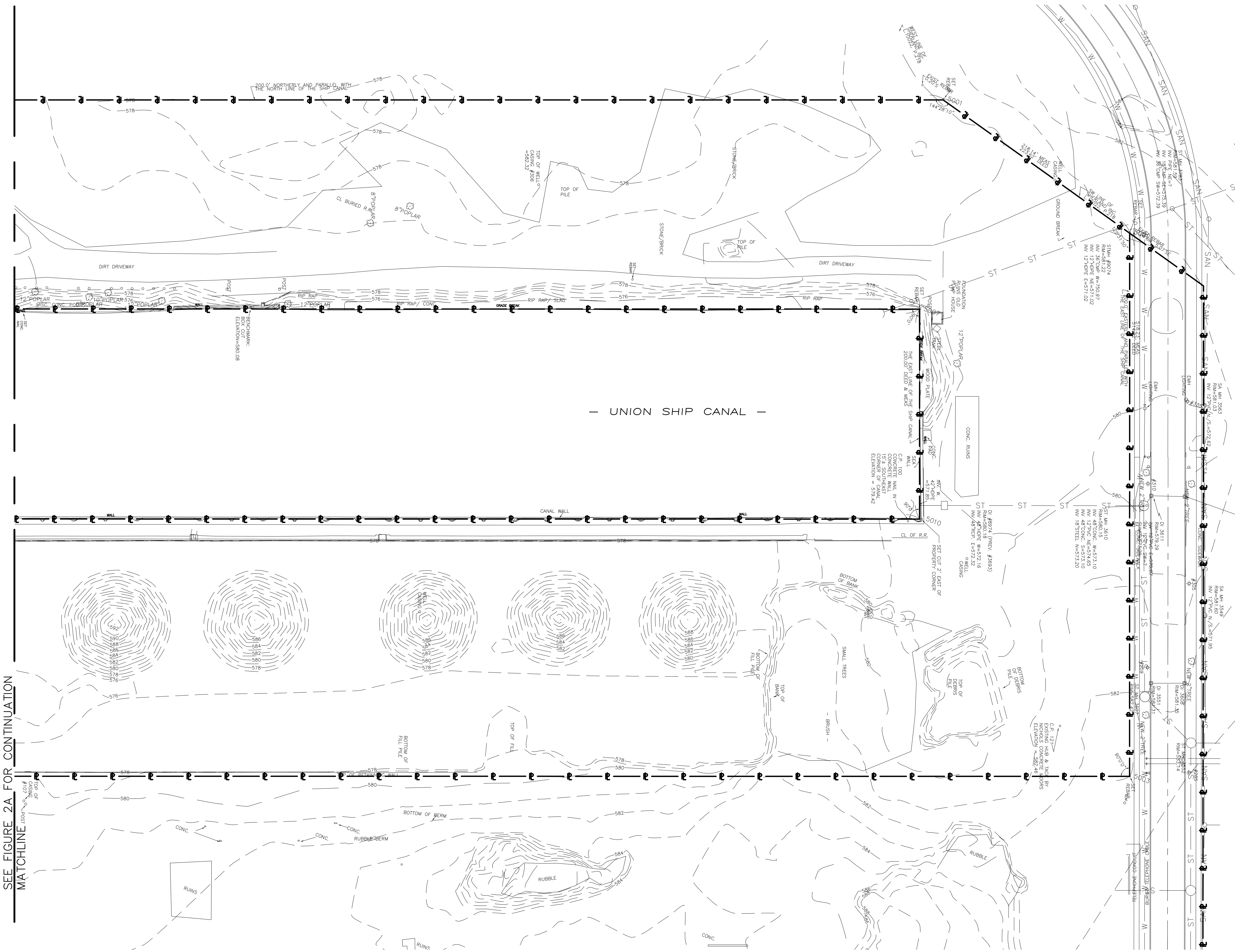
PROJECT SITE PLAN — WEST PLAN

SCALE: 1"=100'

ARCADIS U.S., INC.

NOVEMBER 2011

FIGURE 2A



LEGEND:

—ᘓ—ᘓ—ᘓ—	PROPERTY LINE
——— · ———	PROJECT LIMIT LINE
- - -578- - -	EXISTING CONTOUR
576.03	EXISTING SPOT ELEVATION
——578——	PROPOSED CONTOUR
—— SF ——	EXISTING SILT FENCE / STRAW BALE DIKE

NOTES:

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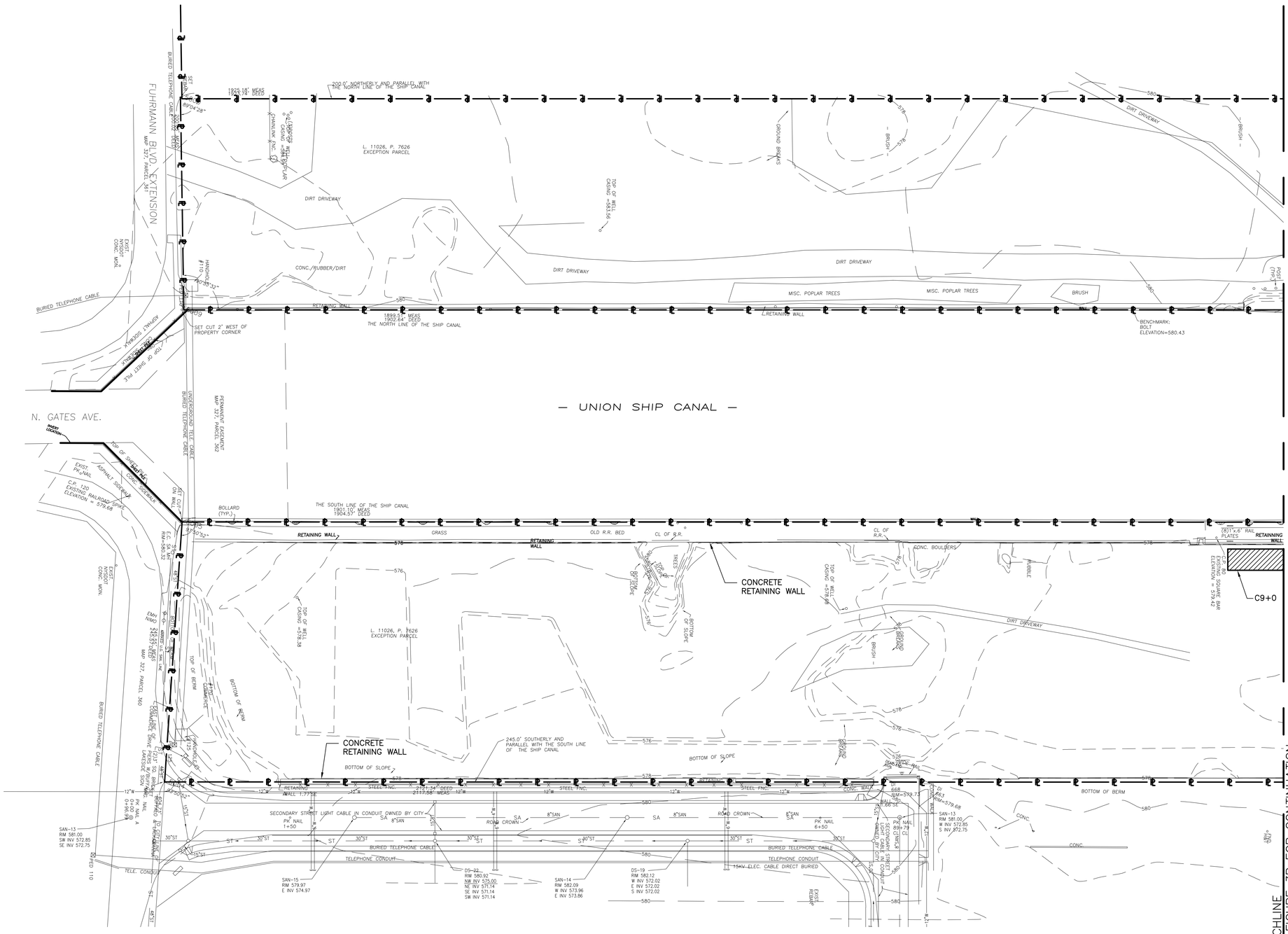
5. ERIE COUNTY WATER AUTHORITY WILL BE DELIVERING BUD MATERIAL TO BE UTILIZED IN THE CLEAN SOIL CAP STARTING IN AUGUST 2009. CONTRACTOR SHALL COORDINATE OPERATIONS TO FACILITATE THESE DELIVERIES.

50 0 50 100

SCALE: 1" = 100'

ARCADIS	BUFFALO URBAN DEVELPOMENT CORPORATION UNION SHIP CANAL OPEN SPACE PARCEL 3 DEVELOPMENT	PROJECT SITE PLAN — EAST PLAN SCALE: 1"=100'	ARCADIS U.S., INC. NOVEMBER 2011 FIGURE 2B



LEGEND:

- PROPERTY LINE
- PROJECT LIMIT LINE
- 578 — EXISTING CONTOUR
- 576.03 — EXISTING SPOT ELEVATION
- 578 — PROPOSED CONTOUR
- SF — EXISTING SILT FENCE / STRAW BALE DIKE
- LOCATION OF SAMPLED SOIL/FILL PILE

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SCALE: 1" = 100'

ARCADIS

BUFFALO URBAN DEVELPOMENT CORPORATION

UNION SHIP CANAL OPEN SPACE PARCEL 3 DEVELOPMENT

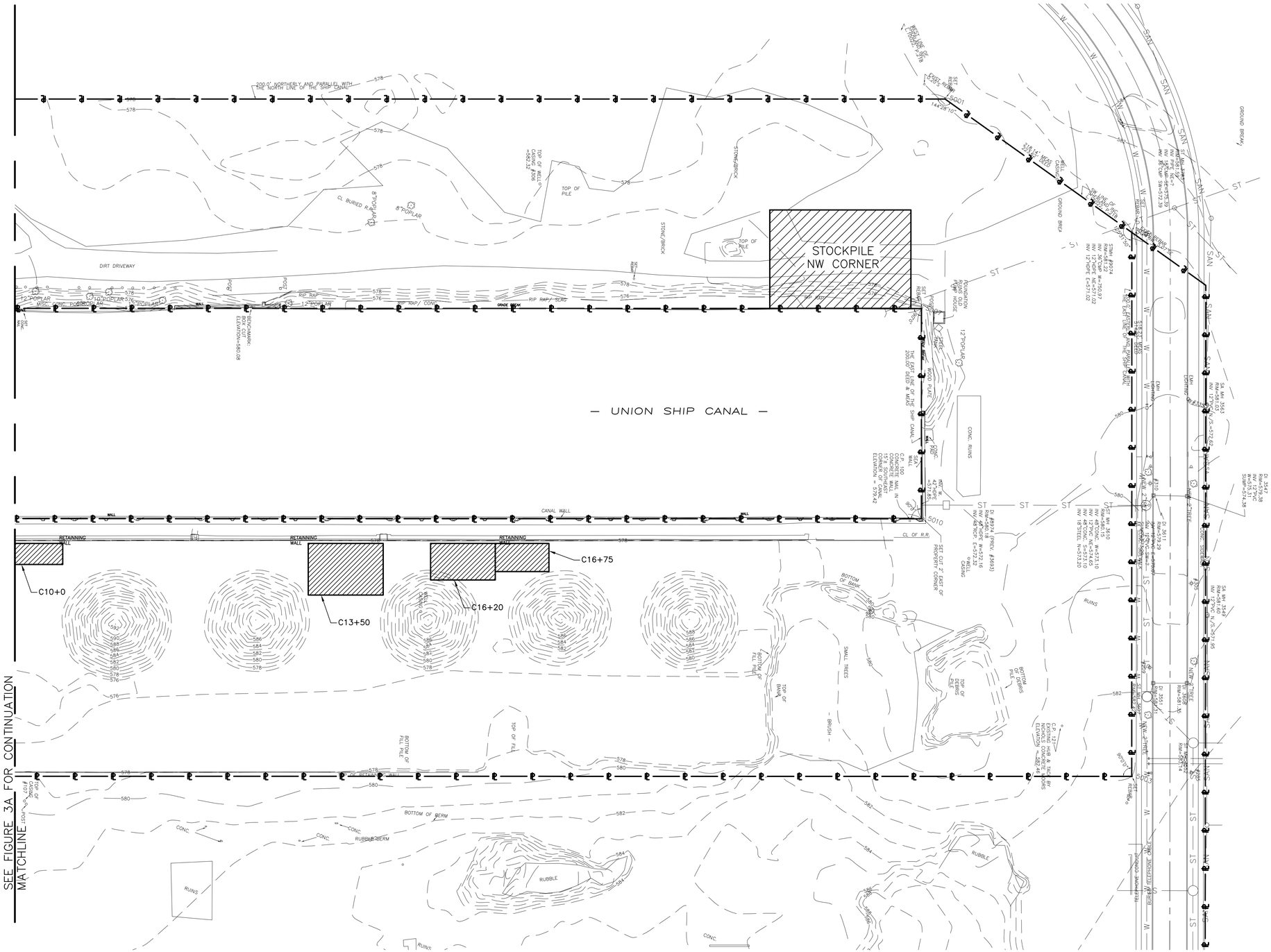
ON-SITE SUBGRADE SAMPLE LOCATIONS WEST PLAN

SCALE: 1"=100'

ARCADIS U.S., INC.

NOVEMBER 2011

FIGURE 3A



LEGEND:

—ᴘ—ᴘ—ᴘ—	PROPERTY LINE
——— · ———	PROJECT LIMIT LINE
- - - -578- - - -	EXISTING CONTOUR
576.03	EXISTING SPOT ELEVATION
———578———	PROPOSED CONTOUR
——— SF ———	EXISTING SILT FENCE / STRAW BALE DIKE
▨	LOCATION OF SAMPLED SOIL/FILL PILE

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50 0 50 100
SCALE: 1" = 100'

ARCADIS

BUFFALO URBAN DEVELPOMENT CORPORATION
UNION SHIP CANAL OPEN SPACE
PARCEL 3 DEVELOPMENT

ON-SITE SUBGRADE SAMPLE LOCATIONS
EAST PLAN
SCALE: 1"= 100'

ARCADIS U.S., INC.
NOVEMBER 2011
FIGURE 3B

User: dewyer Spec: PIRNIE STANDARD File: F:\4080007\CADD\GEN\FIGURES\FIGURE 3B.DWG Scale: 1:1 Date: 11/14/2011 Time: 10:04 Layout: G07
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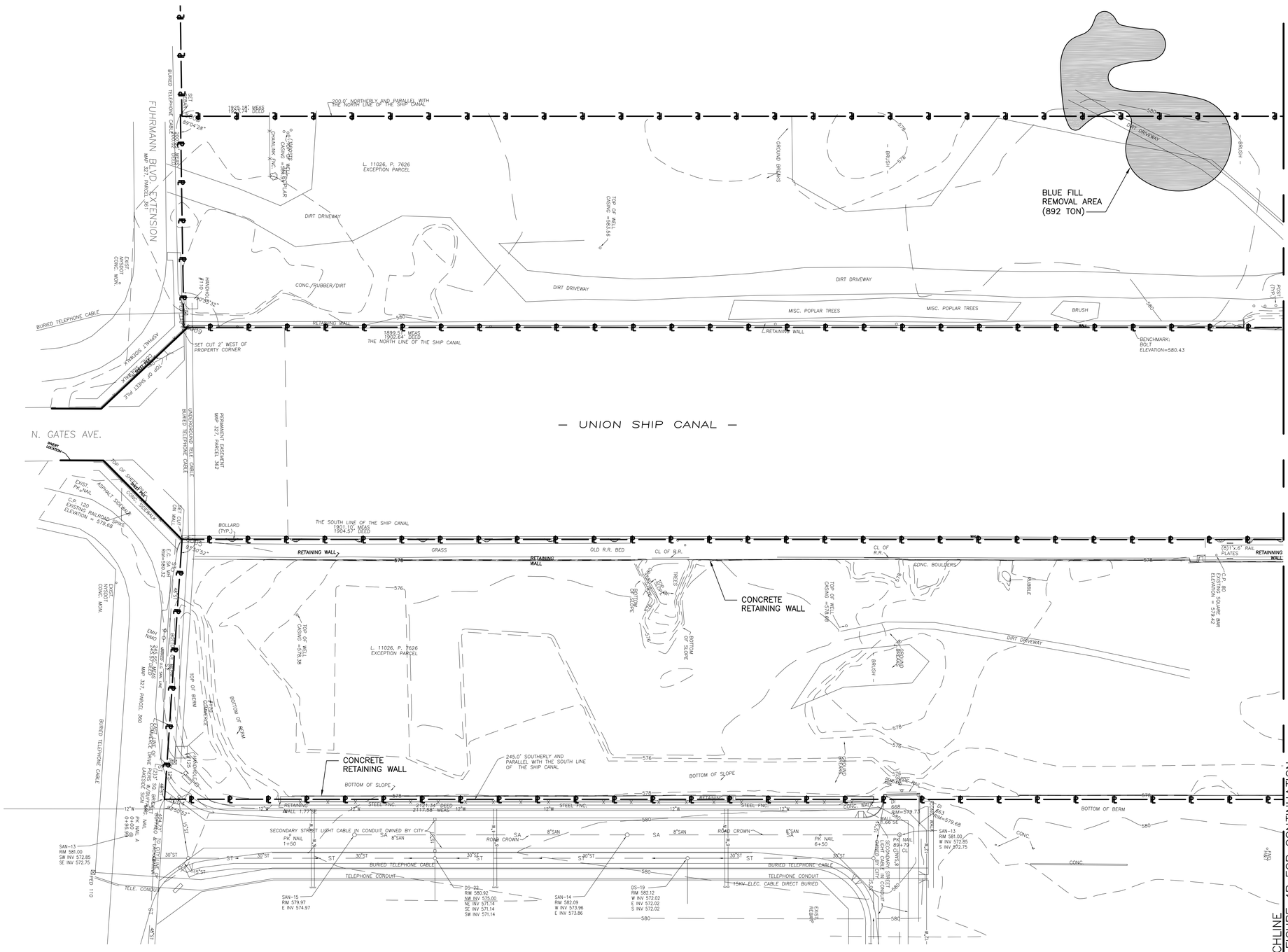

LEGEND:

- PROPERTY LINE
- PROJECT LIMIT LINE
- EXISTING CONTOUR
- 576.03 EXISTING SPOT ELEVATION
- PROPOSED CONTOUR
- SF EXISTING SILT FENCE / STRAW BALE DIKE

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SCALE: 1" = 100'

ARCADIS

BUFFALO URBAN DEVELPOMENT CORPORATION

UNION SHIP CANAL OPEN SPACE PARCEL 3 DEVELOPMENT

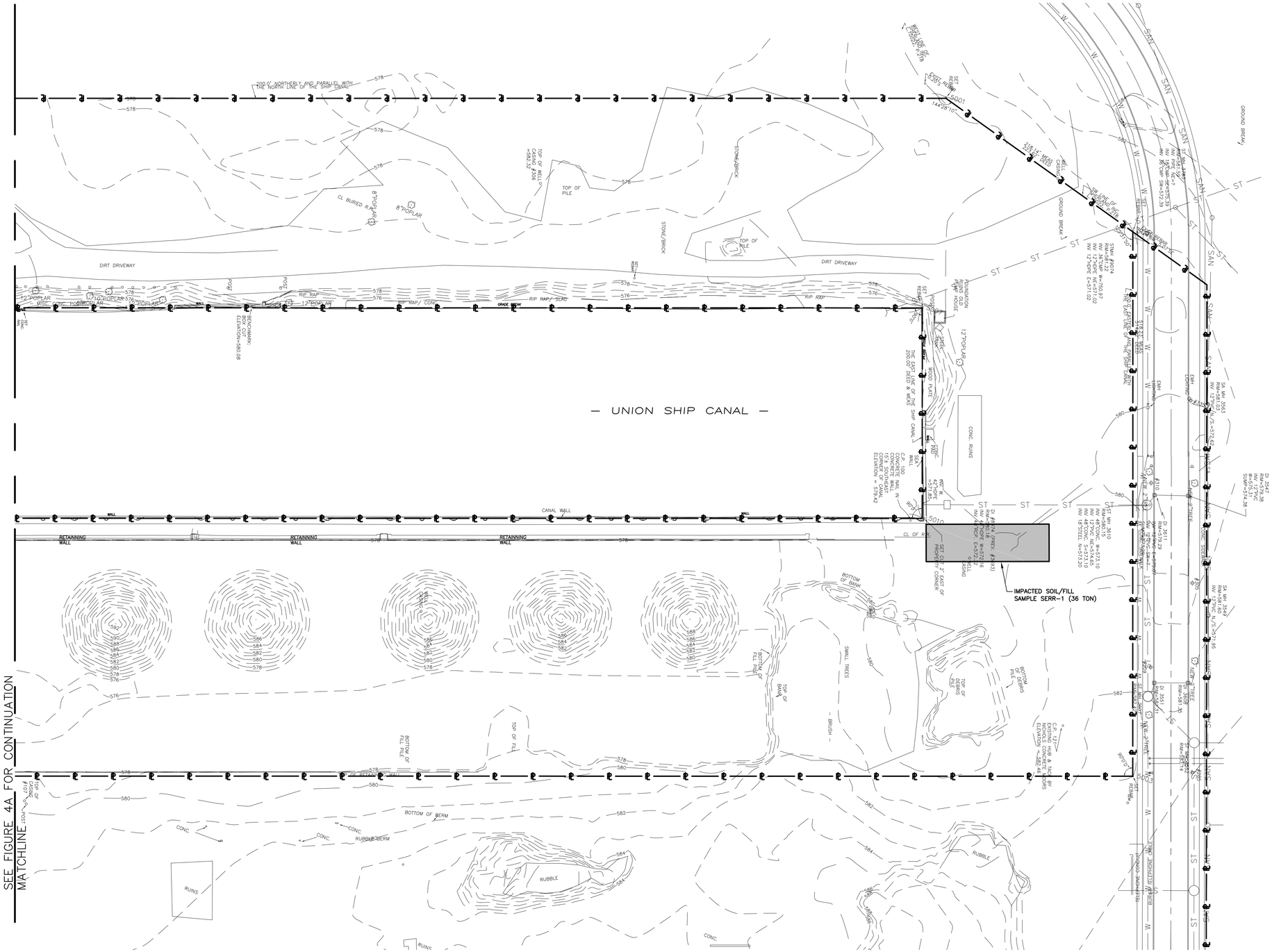
LOCATIONS OF IMPACTED SOIL/FILL REMOVAL WEST PLAN

SCALE: 1"=100'

ARCADIS U.S., INC.

NOVEMBER 2011

FIGURE 4A



LEGEND:

—ᘓ—ᘓ—ᘓ—	PROPERTY LINE
—— · ——	PROJECT LIMIT LINE
- - -578- - -	EXISTING CONTOUR
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50 0 50 100
SCALE: 1" = 100'

ARCADIS

BUFFALO URBAN DEVELPOMENT CORPORATION
UNION SHIP CANAL OPEN SPACE
PARCEL 3 DEVELOPMENT

LOCATIONS OF IMPACTED SOIL/FILL REMOVAL
WEST PLAN
SCALE: 1"=100'

ARCADIS U.S., INC.
NOVEMBER 2011
FIGURE 4B

User:DEWYER Spec:PIRNIE STANDARD File:F:\4080007\CADD\GEN\FIGURES\FIGURE 4B.DWG Scale:1:1 Date:11/28/2011 Time:15:26 Layout:Layout1
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